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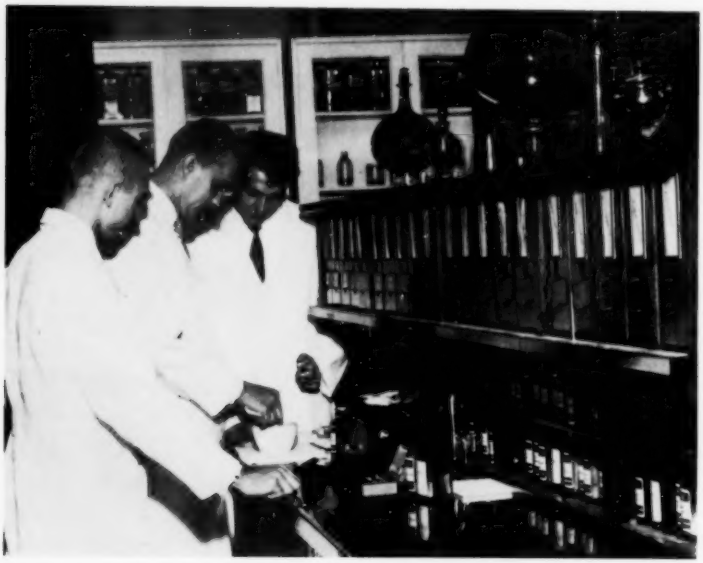

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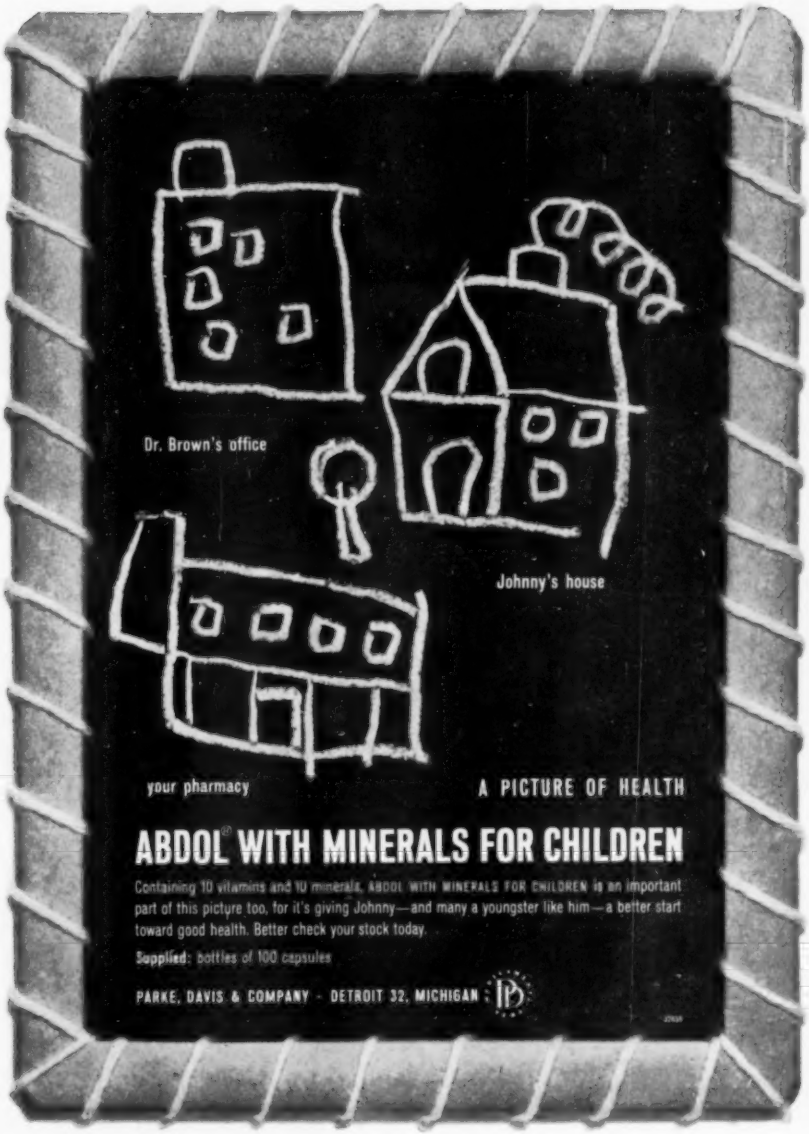
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E D I T O R I A L

STUDENT RECRUITMENT AND THE PHARMACIST

FOR the past several years, organized pharmacy has been giving increasing attention to the problem of student recruitment. Among the many activities in this direction may be cited the work of the Committee on Recruitment Aids of the American Association of Colleges of Pharmacy. This Committee, with the financial support of the American Foundation for Pharmaceutical Education, has prepared several editions of an excellent booklet titled *Shall I Study Pharmacy?* and, with the guidance of commercial film producers, has also prepared two sound motion pictures for use in interesting young people in a career in pharmacy. These recruitment aids have had very wide distribution and, undoubtedly, have done a great deal of good. Many other important efforts can be cited such as those undertaken by McKesson & Robbins and also the National Association of Chain Drug Stores. All of these programs are quite worthwhile and greatly needed since there is today the most energetic kind of competition between each of the various scientific and professional fields. Each is trying desperately to encourage the most capable students to consider its respective area of higher education. It is not pharmacy alone which lacks capable, well-motivated students and, in fact, some other areas are much worse off than our own. We may expect these efforts in all of these fields to be intensified just as we ourselves must not fail to do everything possible to bring into pharmacy young men and young women of great promise. It has been said many times—and it is true without question—that the future status of any profession or calling depends more on the quality of those young people who enter the field than upon any other single factor. If, indeed, pharmacy of tomorrow is to be what we all hope for it, then all of us must do everything in our power to interest the right kind of young people in a pharmaceutical career.

The one weak spot in our over-all recruitment program lies in the attitude of a rather sizeable number of practicing pharmacists. Not only do they fail to make any effort at all in recruiting good

students for pharmacy but, what is worse, they try by every means at their disposal to discourage those who come to them manifesting some interest in pharmacy. This discouragement sometimes takes the form of outright advice that the young person consider some other field! In other instances, it is manifested by an unwillingness to even discuss it and, in still other instances, the young person has his enthusiasm dampened by what he sees in the environment and surroundings of the pharmacist as he engages in his work.

For some unexplained and illogical reason, many retail pharmacists think that the task of recruiting students is solely that of the pharmaceutical industry or more commonly, of college deans. The truth of the matter is that the entire industry and all of those engaged in pharmaceutical education cannot possibly have the impact on the public attitude toward pharmacy which retail pharmacy exerts each day. More people visit retail pharmacies each day than are seen by all the physicians and dentists in the country and, in the mind of the average person, pharmacy is the picture created by his own local drug store. Few people ever have the opportunity of seeing inside a pharmaceutical manufacturing plant and still fewer visit a college of pharmacy. The net result is that all of our current recruitment efforts will prove almost meaningless unless the rank and file in retail pharmacy support our program and become individual missionaries. It is they who must convey to the young people whom they meet the advantages of pharmacy as a career and its many rewards.

No field of human endeavor is without its weak spots and its liabilities. This is true of pharmacy just as it is true of everything else. The life of a physician is no "bed of roses" but it is rare to hear a physician complain about it in public. The truth is that the average physician is more a slave to his professional responsibilities than is the average pharmacist and he probably puts in longer hours, some under the most unpleasant and uncomfortable conditions. While the physician's income is good, pharmacy in recent years has surely been a financially rewarding profession as almost any survey of average drug store earnings will show. In those instances where a pharmacist has not done too well, it is not pharmacy which is at fault but, more often, the result of individual shortcomings.

Our profession needs now and will continue to need more and more well-motivated, capable young people in our colleges. It is a simple fact that this just will not be achieved unless more pharmacists

on "Main Street, U. S. A." join with us in this recruitment effort. The responsibility for this is a total one and it must be shared by everyone who is a part of the entire body of pharmacy. Manufacturers, wholesalers, educators, and—last but most important—retail pharmacists. It is the latter who have the most profound influence on public opinion not only in establishing what pharmacy is and does, but whether it is a good choice for students who are selecting a career. Unless the rank and file of pharmacists the country over accept this challenge and begin giving it some of their time and attention, we shall never succeed in building our profession to those heights which the future will demand of us.

L. F. Tice

CURRENT STATUS OF THROMBOLYTIC AGENTS

By Norton H. Neff *

DESPITE recent advances in diagnostic and therapeutic techniques, arterial and venous thromboses remain a major cause of morbidity and mortality. It has become apparent that the anticoagulant drugs do not provide a definitive answer to this problem. Anticoagulant therapy serves only to prevent further thrombotic complications; it does not remove clots which have already formed. Surgically directed approaches to the problem are often frustrated by the complexities of vascular thrombosis.

In recent years, much attention has been directed toward a class of substances grouped together under the general designation of thrombolytic agents. These compounds share the ability to promote the dissolution of the fibrin network upon which a thrombus is constructed. By exerting fibrinolytic effects within the vascular system, such agents are potentially capable of acutely dissolving thrombotic material.

Perhaps the first fibrinolytic agent to attract attention was streptokinase. This material was first demonstrated in the filtrates of cultures of beta-hemolytic streptococci by Tillett and Garner in 1933 (1). While frequently regarded as a fibrinolytic substance, streptokinase has no direct action on fibrin. Rather, it functions as an activator of the plasma proenzyme, profibrinolysin (plasminogen), either by direct action or by converting a plasma proactivator to an activator (2). By such action, streptokinase catalyzes the conversion of profibrinolysin to fibrinolysin (plasmin). Therefore, the effect of streptokinase is dependent on the presence and concentration of plasma profibrinolysin. Unfortunately, inhibitors of streptokinase are present in a significant portion of the population, probably as a consequence of the ubiquity of streptococcic infections (3). The presence of antistreptokinase factors in the plasma may not only increase the risk of allergic reaction, but also tends to limit the fibrinolytic activity which can be achieved by streptokinase infusions (4). Intravenous

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infusions of streptokinase have been used in the treatment of certain forms of thromboembolic diseases with varying degrees of success.

Interpretation of streptokinase data has been complicated by the fact that thus far only impure materials have been available for testing (5). The most purified preparations of streptokinase available still retain toxic potential and appear to provide an unreliable method for achieving plasma fibrinolytic activity in man at well tolerated dosage levels (6, 7).

Streptokinase has also been shown to reduce inflammation and edema in a variety of traumatic and inflammatory disorders. The mechanism initiated by streptokinase by which inflammation and edema are reversed may permit the migration of bacteria from a primary site of infection to other regions of the body. It is mandatory, therefore, that patients harboring or suspected of harboring an infection be treated with an antibacterial drug concurrently with the streptokinase. Since both allergic and inhibitory phenomena are likely to be enhanced by streptokinase administration, the therapeutic value of this agent becomes subject to question (4).

Other workers have explored the use of the enzyme trypsin as a thrombolytic agent. In 1932, John H. Northrop and his colleagues at the Rockefeller Institute for Medical Research succeeded in isolating trypsin as a purified crystalline material (8). Trypsin has been used topically in various types of wounds to debride necrotic tissue by proteolytic action and, thus, promote healing (9). Solutions of trypsin have been injected into closed cavities to lyse viscous exudates (10), and inhalations of trypsin have been used to liquefy tenacious mucus (11). Trypsin lyses fibrin directly and also serves as an activator of profibrinolysin (12).

Being aware of the proteolytic effect of trypsin, Innerfield *et al.* (13) attempted to utilize this activity to break down blood clots. They used high dosage levels by the intravenous route in both animals and humans. It was subsequently found that considerably smaller doses of intravenous trypsin were as effective as the larger doses previously used (14). This led to the development of trypsin suspension in sesame oil for intramuscular use which was found to be clinically effective in those conditions responsive to intravenous trypsin (14). It has recently been reported that systemic activity is manifested following buccal administration of the enzyme in tablet form. It would appear that local changes in permeability produced by

trypsin are sufficient to permit its absorption through the buccal mucosa; this has been found to be the case in animals (15).

The proteolytic enzyme chymotrypsin has also been applied locally and administered systemically to patients suffering from vascular thrombosis or from diseases characterized by undesirable fibrin deposits (16, 17). Although the local application of proteolytic enzymes is widely practiced, systemic use has not met with general acceptance. In addition to such hazards as sensitization to foreign protein and the severe side reactions which may follow systemic administration in adequate doses, the lack of specificity of these enzymes is a serious disadvantage (18). Studies by Ambrus *et al.* (19) indicated that systemic doses of trypsin, chymotrypsin, crude pancreatic protease, papain, and ficin, sufficient to produce intravascular lysis of experimental clots in dogs also produced reduction in the levels of several proteins involved in the blood clotting system, occasionally resulting in fatal hemorrhage. These considerations appear to render systemically administered proteolytic enzymes unsuitable as agents for achieving dissolution of intravascular clots in man.

In vivo activation of fibrinolytic substances in blood has been accomplished by a variety of substances. Weiner *et al.* (20) recently described the consistent appearance of fibrinolytic activity in man following intravenous injection of the relatively simple substance, nicotinic acid. The observation was made during a study of the influence of vasodilator drugs on the clotting mechanism.

As it became evident that there were several theoretical and practical limitations to the use of streptokinase and the proteolytic enzymes, trypsin and chymotrypsin, as thrombolytic agents, interest centered on fibrinolysin itself as a possible therapeutic weapon. Fibrinolysin is a proteolytic enzyme which manifests selective affinity for fibrin as a substrate (21). Its physiological role is believed to be the lysis of the fibrin deposits in blood vessels and tissues which result from the minor injuries and spontaneous thromboses of everyday life (22). Of all materials evaluated, only preparations of fibrinolysin effectively lysed venous or arterial clots in nontoxic concentrations (18).

Fibrinolysin is selectively adsorbed on, and hydrolyzes fibrin into smaller dispersible fragments. Free fibrinolysin is not normally found in the blood, but its precursor, profibrinolysin, is a normal plasma constituent. Profibrinolysin is transformed to fibronolysin by a

number of activators present in tissues and in various body secretions (urine, tears, milk, saliva, and seminal fluid). Profibrinolysin activators may play a physiological role in keeping narrow channels of excretion open. Tissue activators may appear in the circulation during stress, muscular exercise, hypoxia, and after epinephrine injections. Blood also contains an anti-fibrinolysin factor which rapidly neutralizes fibrinolysin.

When tissues are damaged, thromboplastin is liberated and the complex mechanism of blood clotting, leading to fibrin deposition, is initiated. Fibrin promotes hemostasis and forms a matrix for the reparative processes of tissues. Profibrinolysin activators are also released at the injured site. Circulating profibrinolysin is locally converted into fibrinolysin, which binds to the fibrin fibers and dissolves them after a period of time. Thus, repair can proceed without scar formation. Plasma anti-fibrinolysin apparently inactivates any excess of free fibrinolysin in the circulation (18).

In certain disease states, notably carcinoma of the prostate, large amounts of free fibrinolysin appear in the blood and lead to a hemorrhagic diathesis. On the other hand, some patients who suffered from repeated thromboses were found to have high levels of circulating anti-fibrinolysin. Deficiencies in the fibrinolytic system have recently been implicated in the development of atherosclerotic lesions on the basis of excessive fibrin deposits in the vascular intima (*22*).

The presence of an intrinsic fibrinolytic agent in the blood of man and other mammalian species had been demonstrated before the turn of the century, but only recently have technological advances permitted its satisfactory isolation from human and bovine plasma. Human profibrinolysin is obtained from the globulin fraction of the plasma proteins and can be activated in several ways (23). A potent activator is bacterial streptokinase, mentioned previously. The enzyme, urokinase, derived from human urine is also effective (24). Spontaneous conversion of profibrinolysin to fibrinolysin takes place under certain physical and chemical conditions; however, these represent inefficient means of preparing fibrinolysin. Bovine fibrinolysin may be activated with chloroform.

Since fibrinolysin has become available for investigational use, a number of important facts relating to it have become established. Unlike trypsin and chymotrypsin, fibrinolysin given intravenously does not attack a variety of plasma proteins with equivalent effect.

Rather, it chooses fibrin as its major target of enzymatic activity (5). This specificity of action appears related to the fact that fibrin actually adsorbs fibrinolysin (22). These qualities enable this agent to achieve satisfactory intravascular fibrinolytic activity without disturbance of the coagulation mechanism over a wide dosage range (26).

Several investigators have shown that infusions with fibrinolysin will consistently dissolve experimentally produced arterial and venous thromboses in the dog and rabbit and effectively lyse pathologically occurring thromboses in the human (4, 19, 26, 27). Sokal *et al.* (18) reported that, when the interval between formation of the clot and administration of fibrinolysin was 72 hours or less, clot lysis was observed in most experiments. Clots three or more days old showed only partial or no lysis. Clinical studies have suggested that rethrombosis after successful clot dissolution may occur when fibrinolysin is used alone, but can be prevented when heparin is used concurrently (26). Therefore, it appears that anticoagulant drugs should be used to avoid rethrombosis, unless circumstances clearly indicate that the factors which led to thrombosis have subsided (4).

Sokal *et al.* (18) investigated the toxicity of intravenously infused fibrinolysin in 37 patients. Untoward reactions varied greatly depending on the preparations used. The most severe reactions were induced by preparations containing an excess of crude streptokinase. Variation in the methods of preparation and the activators used resulted in products with decreased toxicity. Two human fibrinolysin preparations were obtained which produced either slight or no undesired reactions. One of these was a purified streptokinase-activated fibrinolysin; the other was activated with urokinase. However, even the nontoxic streptokinase-activated materials were antigenic and resulted in the production of anti-streptokinase antibodies and skin sensitivity to crude streptokinase. The urokinase-activated preparation did not induce antibody production or skin sensitivity. Spontaneously activated human fibrinolysin and cloroform-activated bovine fibrinolysin elicited few or no side reactions. However, these preparations appeared to be less effective than the streptokinase-activated or urokinase-activated human fibrinolysins (18).

The availability of an agent of low toxicity capable of acutely dissolving intravascular clots would represent a major advance in the therapy of thromboembolic diseases. On the basis of the studies

reported, one is justified in cautiously suggesting that fibrinolysin (plasmin) may be such an agent.

Urokinase-activated fibrinolysin appears to be the least toxic and most active preparation thus far developed for thrombotic diseases. Streptokinase-activated preparations in all cases produced sensitization of the patient. Trypsin and chymotrypsin, because of their destruction of proteins essential for blood coagulation, are inferior to fibrinolysin preparations. Simple non-enzymatic substances may hold the key to nontoxic fibrinolysis; these remain to be investigated more completely.

The observations briefly outlined in this paper constitute an impressive array of "plus signs" on the fibrinolysin balance sheet. However, at least four major facets of fibrinolysin therapy appear to require further study: (a) certain aspects of fibrinolysin toxicity; (b) establishment of proper dosage schedules; (c) accurate estimation of the value of fibrinolysin in various thromboembolic states; and (d) the need for anticoagulant therapy after acute thrombolysis.

Depending upon the circumstances, blood coagulation may save or destroy life. More efficient control of the various facets of this complex physiologic mechanism will contribute immeasurably to the medical management of disease.

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EARLY U. S. PHARMACEUTICAL CATALOGUES

By George B. Griffenhagen * and Lawrence B. Romaine **

COLLECTORS of pharmaceutical antiques as well as historians and museum curators are frequently faced with the task of identifying pharmaceutical equipment and drugstore sundries, determining the date of origin, the period of use, the manufacturer and distributor. Newspaper and pharmaceutical journal advertisements,[1] early pharmaceutical textbooks,[2] and original invoices, day books and ledgers are all valuable sources of information, but all have decided limitations. No single source, save well-documented museum collections, is as valuable and informative as the early pharmaceutical manufacturers' or wholesalers' catalogues.[3]

The development of trade catalogues in America has gone hand-in-hand with the evolution of advertising and merchandising in our country; in fact, it can even be related to the very manner in which our country has developed. So extensive and diversified has been this development that today, of the hundreds of specialized crafts, trades and professions, there is none which cannot point to a long list of trade catalogues published over the years. The number of catalogues necessary to keep pace with our present luxurious way of life has of course increased by the thousandfold. Our ancestors have thrown away old catalogues by the hundreds, and we must dispose of millions. Our libraries and museums are faced with the battle of

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[1] The early issues of the *American Journal of Pharmacy* carried few advertisements for equipment, and most library sets have removed the advertising sections which existed from their bound copies. *The Druggist Circular*, established in 1857, carried many advertisements for equipment, and it was nearly impossible to eliminate these from bound copies.

[2] Mohr, Redwood and Procter's *Practical Pharmacy*, Philadelphia, 1849; and Edward Parrish's *An Introduction to Practical Pharmacy*, Philadelphia, 1856, are valuable sources of information on early pharmaceutical equipment.

[3] Griffenhagen, G. B., "Identifying Antiques", *Journal of the American Pharmaceutical Association, Practical Pharmacy Edition*, vol. 16, page 82, February, 1955.

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" nitrosum	12	37
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Page of the Massachusetts College of Pharmacy 1828 Catalogue Showing Printed Prices

the bulk, so that only the best examples in each line can possibly be saved for future research.[4]

In the past, as today, it has been the habit of house cleaners to throw away out-dated catalogues. The librarian of the American Pharmaceutical Association observed in 1955 [5] that libraries also have had a hand in this type of house cleaning due to lack of staff, space, and historical sense. On the other hand, we are fortunate that a few farsighted historical research workers did recognize the value of the trade catalogues before the destructive paper drives of recent years. But for their imagination, we would not have this valuable source of records for reference and research.[6]

Before the Revolution, very few trade catalogues were issued; most merchants advertised their wares in the newspapers or issued broadsides and circulars. In pharmacy, most of these dealt with the English patent medicines.[7] One unusual example is the thirty-six page pamphlet dated 1731 published by John Peter Zenger in New York City on behalf of Bateman's Pectoral Drops.[8] Although these broadsides and handbills were intended to promote sales and occasionally included the names of other available items, we have not classified them as pharmaceutical catalogues in this review because they are intended primarily to advertise a single product.

It appears that the earliest actual pharmaceutical catalogue published in the U. S. was the *Catalogue of Druggs, and of Chymical and Galenical Medicines; Sold by John Tweedy at his Shop in Newport, Rhode-Island. And for him in New-York, at the Sign of the Unicorn*

[4] Romaine, Lawrence B., "Trade Catalogues," *The Concise Encyclopedia of American Antiques* (Helen Comstock, Editor), vol. I, pp. 238-244, New York, 1958.

[5] Griffenhagen, *op. cit.* See also Carl W. Dreppard, "Illustrated Merchandise Catalogues," *The Primer of American Antiques*, Garden City, New York, 1945, p. 174; as well as Carl W. Dreppard and Marjorie Matthews Smith, "Catalogs of Merchandise," *Handbook of Tomorrow's Antiques*, New York, 1953, pp. 27-29.

[6] Romaine, *op. cit.*

[7] See Young, James Harvey, and George Griffenhagen, "Old English Patent Medicines in America," *The Chemist and Druggist* (London), vol. 167, pages 714-722, June 29, 1957.

[8] An original copy of the Zenger-Bateman pamphlet is preserved in the New York Academy of Medicine Library, New York City, according to Gertrude L. Annan, "Printing and Medicine," *Bulletin of the Medical Library Association*, vol. 28, p. 155, March, 1940. The Zenger-Bateman pamphlet may well have been the earliest work on any medical theme to be printed in New York.

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" " " "	6	"				7 00
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" " " "	5	"				8 00
" " " "	6	"				8 00
" " " "	8	"				9 00
" " " "	10	"				10 00
" " " "	12	"				1 00
" " " "	14	"				12 00
" " " "	16	"				13 00

Page From Van Schaack, Stevenson & Reid 1874 Chicago Catalogue Advertising Prescription Glassware

and Mortar. While undated, there is little doubt that it dates from 1757 to 1760.[9] The Tweedy catalogue set a style and format for later catalogues published in America but it was itself copied from earlier English catalogues.[10]

The only other pre-Revolutionary War American drug catalogue known is the Day-Dunlap Philadelphia catalogue in 1771. John Dunlap, printer in Market Street, Philadelphia, published a general *Catalogus Medicinarum et Pharmacorum* for use by any and all druggists, as well as a special edition bearing a separate title page and introduction by John Day, and Co. Druggists and Chymist in Second-Street, Philadelphia. The rest of the catalogues were identical, except for individual manuscript notations in existing copies.[11]

Until 1826, the American pharmaceutical catalogues followed the pattern established by their pre-Revolutionary counterparts. Smith and Bartlett (Boston, 1795); Joel and Jotham Post (New York, 1804); George Brinley (Boston, c. 1812) and Charles White (Boston, 1817) all followed the pattern whereby the articles are enumerated without printed prices; these were to be added by the pharmacist. According to Kremers and Urdang [12] "the American economic and trade situation at this time was not sufficiently stabilized to make fixed prices workable".

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[9] Griffenhagen, George, "John Tweedy's Catalogue of Druggs," *Journal of the American Pharmaceutical Association, Practical Pharmacy Edition*, vol. 19, pp. 498-499, August, 1958. The Tweedy Catalogue is among the first of any type of trade catalogue published in America. It is certainly older than the Gorgas clockmaker catalogue of 1765 mentioned by Morgan Towne, "Merchandise and Mail-Order Catalogues," *Treasures in Truck & Trash*, Garden City, New York, 1949, pp. 91-97 as "the earliest American catalogue of which we have record." However, it does not pre-date Benjamin Franklin's 1744 brochure of his newly invented cast-iron fireplace store.

[10] These include *A Catalogue of Druggs; and of Chemical and Galenical Medicines, Prepared and Sold by Silvanus and Timothy Bevan in Plow-Court in Lombard-Street, London* (undated but ascribed between 1736 and 1757) now preserved in the Library of the Pharmaceutical Society of Great Britain, London, England; and *A Catalogue of Druggs, and of Chymical and Galenical Medicines, Prepared and Sold by Lud Palmer and John Clarke, Chymists, in Barbican, London, Printed by Cluer Dicey in Bow-Church-Yard*, 1757, now preserved in the private collection of Mrs. Kathleen Tilley, London, England. The similarity of titles is certainly much more than a coincidence.

[11] Griffenhagen, George, "The Day-Dunlap 1771 Pharmaceutical Catalog," *American Journal of Pharmacy*, vol. 127, pp. 296-302, September, 1955; also reprinted in *The New York Physician and American Medicine*, vol. 46, pp. 42-44, May, 1956.

[12] Kremers, Edward, and George Urdang, *History of Pharmacy*, Philadelphia, 1951, p. 230-231. In contrast to the American catalogues, the *Prix courants des preparations de chymie et de pharmacie qui se trouvent a Paris chez Baume, apothicaire*, Paris, 1775 gives printed prices for the 2400 items listed.

A

Catalogue of Druggs,

AND OF

Chymical and Galenical

MEDICINES:

SOLD BY

JOHN TWEEDY

AT HIS SHOP

IN

Newport, Rhode-Island.

AND FOR HIM

IN

NEW-YORK,

AT THE SIGN OF THE

UNICORN and MORTAR.

SURGEON GEN'LS OFFICE 89738. LIBRARY.

Title Page of the Earliest Known Pharmaceutical Catalogue Published in the U. S., Circa 1760

Even *The Druggist's Manual being A Price Current of Drugs, Medicines . . . Compiled by Direction of the Philadelphia College of Pharmacy*, 1826 provided only "columns to be filled in with pencil or ink, for the purpose of forming a price current." [13] It therefore appears that the first American drug catalogue to include printed prices was the *Catalogue of the Materia Medica, and of the Pharmaceutical Preparations, with the Uniform Prices of the Mass. College of Pharmacy*, Boston, 1828. In the introduction to this catalogue, it was noted that "The Committee for publishing this PRICE BOOK think it proper to mention, that in their opinion a judicious arrangement as to prices is no small means of adding support and dignity to the business." [14]

The size of the pharmaceutical catalogues grew rapidly. Until 1830, they generally ranged from 24 to 36 pages. Then the catalogue of George W. Carpenter of Philadelphia published in 1834 jumped to 320 pages; however, two-thirds of this was *An Essay on Materia Medica*. By the 1850's, the catalogues were generally over 100 pages and, by the 1880's, 400 and 500 pages were not uncommon.

Until the 1850's, most American pharmaceutical catalogues, like their counterparts in other fields, seldom carried illustrations.[15] The Carpenter catalogue of 1834 included an illustration on the frontispiece, but pharmaceutical catalogues did not start illustrations in earnest until the 1850's. The Bullock and Crenshaw catalogues of the 1850's carried the first extensive illustrations of pharmaceutical equipment in this country and, by the 1870's, American pharmaceutical catalogues were profusely illustrated. Those of the 1880's and 1890's carried beautifully colored plates of show globes, drug labels, etc. In 1883, McKesson & Robbins even issued a special Illustrated Catalogue to accompany the regular Prices Current of the same year.

We believe that a guide to the location of existing pharmaceutical catalogues would be helpful to collectors and researchers of these

[13] England, Joseph W. (Editor), *The First Century of the Philadelphia College of Pharmacy*, 1821-1921, Philadelphia, 1922, p. 71.

[14] It is interesting to note that this Catalogue also carries what is probably the earliest Prescription Pricing Schedule devised in the U. S.

[15] English and French pharmaceutical catalogues, on the other hand, included numerous illustrations in the 1830's. Examples include the *Tarif* of *Vimeux Viellard & Cie*, Paris, bound in copy of *Codex Pharmacopee Francaise*, Paris, 1837 preserved at the University of Wisconsin, Madison, Wisconsin; and the *Zaccheus Hunter, Mason & Co. Catalogue*, London, January 1, 1838, preserved at the Wellcome Historical Medical Library, London, England.

Show Bottles, Gilded Mortars, Eagles, &c.

PINE-APPLE SHOW BOTTLES.

With Double Stoppers.

Fig. 29.

Fig. 30

Fig. 31.

Plain.—Fig. 29.				Engraved.—Form same as Fig. 30.			
	Height to centre of large Globe.	Height over all.	Each.		Height to centre of large Globe.	Height over all.	Each.
Quart.	5½ inch.	20 inch. .	$1.00	Quart.	5½ inch.	20 inch. .	$1.75
½ gal.	6½ "	22 " . .	1.50	½ gal.	6½ "	22 " . .	2.00
1 "	7½ "	27 " . .	2.00	1 "	7½ "	27 " . .	3.00
1½ "	8½ "	30 " . .	2.50	1½ "	8½ "	30 " . .	3.50
2 "	10 "	34 " . .	3.00	2 "	10 "	34 " . .	4.00
3 "	12 "	38 " . .	5.00	3 "	12 "	38 " . .	6.00
4 "	14 "	45 " . .	7.50	4 "	14 "	45 " . .	9.00

Page From Hagerty Bros. 1879 New York Catalogue Typical of the Illustrations Employed During This Period

unique records; consequently, we have made a compilation of American pharmaceutical catalogues through 1890.

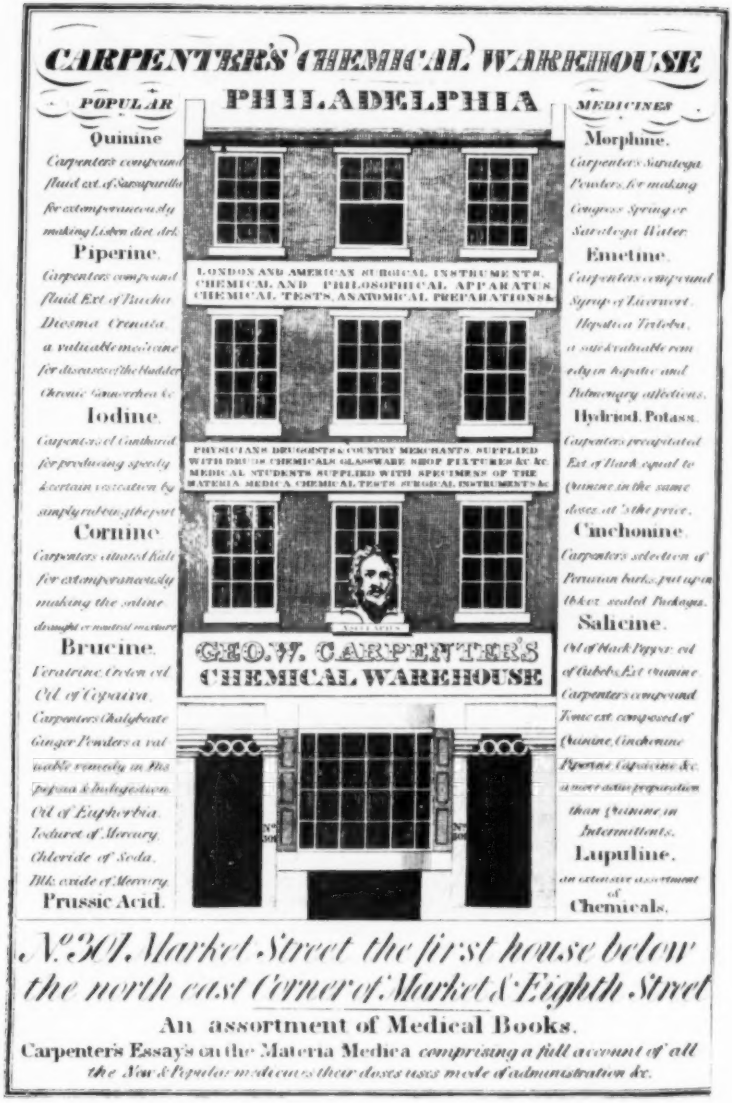
This check list includes only catalogues featuring equipment and drug sundries, except for the very early; therefore, it does not include catalogues of pharmaceutical manufacturers such as Lilly, Squibb, Tilden, Wyeth, etc. Neither does it include catalogues just of specialities like soda fountain apparatus, trusses, artificial limbs, spectacles, and surgical instruments, unless they are a part of a general catalogue of drug sundries and equipment.

The most difficult task in compiling such a check list is classification. Even Smtih and Bartlett in 1795 included dye-stuffs, groceries, and painters' colors. On the other hand, we have omitted some catalogues of surgical instruments, or chemical apparatus which also include sections of pharmaceutical equipment, since we had to draw the line somewhere.

Only leading libraries, museums, and colleges of pharmacy known to have collections of pharmaceutical catalogues were included in the survey. There are still many in private collections as well as in smaller libraries, especially active state and local historical societies. We recognize that the check list is therefore incomplete, and hope that readers will bring to our attention items not yet included.

Complete titles are given only for the early items listed. The following is the Code employed in locating individual copies (using *Union List of Serials* as the guide):

DAPh	American Pharmaceutical Association, Washington, D. C.
DLC	Library of Congress, Washington, D. C.
DNLM	National Library of Medicine, Washington, D. C.
DSI	Division of Medical Sciences, Smithsonian Institution, Washington, D. C.
ICHi	Chicago Historical Society, Chicago, Ill.
ICJ	John Crerar Library, Chicago, Ill.
ICU-M	University of Illinois, Library of Medical Sciences, Chicago, Ill.
MBM	Boston Medical Library, Boston, Mass.
MBP	Massachusetts College of Pharmacy, Boston, Mass.
MdU-D	University of Maryland, School of Pharmacy, Baltimore, Md.


CARPENTER'S CHEMICAL WAREHOUSE
PHILADELPHIA
POPULAR
Quinine
Carpenters compound fluid ext of Sarsaparilla for extemporaneously making Lisbon diet drk.
Piperine.
Carpenters compound fluid Ext of Pinckia Diosma Crenata a valuable medicine for diseases of the bladder Chronic Gonorrhea &c
Iodine.
Carpenters Liniment for producing speedy & certain vesication by simply rubbing the part
Cornine.
Carpenters situated bath for extemporaneously making the saline douche or mutual mixture
Brucine.
Veratrine Croton oil Oil of Copaiva.
Carpenters Chalybeate Ginger Powders a valuable remedy in Dispepsia & Indigestion.
Oil of Euphorbia.
Iodaret of Mercury
Chloride of Soda.
Nitric oxide of Mercury
Prussic Acid.
LONDON AND AMERICAN SURGICAL INSTRUMENTS. CHEMICAL AND PHILOSOPHICAL APPARATUS CHEMICAL TESTS, ANATOMICAL PREPARATIONS &c
PHYSICIANS DRUGGISTS & COUNTRY MERCHANTS SUPPLIED WITH DRUGS CHEMICALS GLASSWARE SHOP FIXTURES &c &c. MEDICAL STUDENTS SUPPLIED WITH SPECIMENS OF THE MATERIA MEDICA CHEMICAL TESTS SURGICAL INSTRUMENTS &c
GEO. W. CARPENTER'S CHEMICAL WAREHOUSE
MEDICINES
Morphine.
Carpenters Saratoga Powders for making Congress Spring or Saratoga Water
Emetine.
Carpenters compound Syrup of Lacerwort. Hepatica Trifolia, a safe & valuable remedy in hepatic and Pulmonary affections.
Hydriod. Potass.
Carpenters precipitated Ext of Bark equal to Quinine in the same doses at ½ the price.
Cinchonine.
Carpenters selection of Peruvian barks put up in 1lb 4oz sealed Packages.
Salicine.
Oil of black Pepper oil of Cubebs Ext Quinine Carpenters compound Tonic ext composed of Quinine Cinchonine Piperine Copaicine &c. a more active preparation than Quinine in Intermittents.
Lupuline.
an extensive assortment of
Chemicals.
No 30 Market Street the first house below the north east Corner of Market & Eighth Street
An assortment of Medical Books.
Carpenter's Essay's on the Materia Medica comprising a full account of all the New & Popular medicines their doses uses mode of administration &c.

Frontispiece of George W. Carpenter 1834 Philadelphia Catalogue Showing an Early Illustration

MnU-Ph University of Minnesota, College of Pharmacy, Minneapolis, Minn.

MWA American Antiquarian Society, Worcester, Mass.

NCGC Corning Glass Center, Corning, N. Y.

NcU-Ph University of North Carolina, School of Pharmacy, Chapel Hill, N. C.

NjWoE Edison Laboratory National Monument, West Orange, N. J.

PC Private Collection (name supplied on request).

PLACC Armstrong Cork Company, Lancaster, Pa.

PPAmP American Philosophical Society, Philadelphia, Pa.

PPiU University of Pittsburgh, Falk Library, Pittsburgh, Pa.

PPPCPh Philadelphia College of Pharmacy, Philadelphia, Pa.

RHi Rhode Island Historical Society, Providence, R. I.

RU-Ph University of Rhode Island, College of Pharmacy, Kingston, R. I.

ViRM Medical College of Virginia, School of Pharmacy, Richmond, Va.

WU-Ph University of Wisconsin, School of Pharmacy, Madison, Wisc.

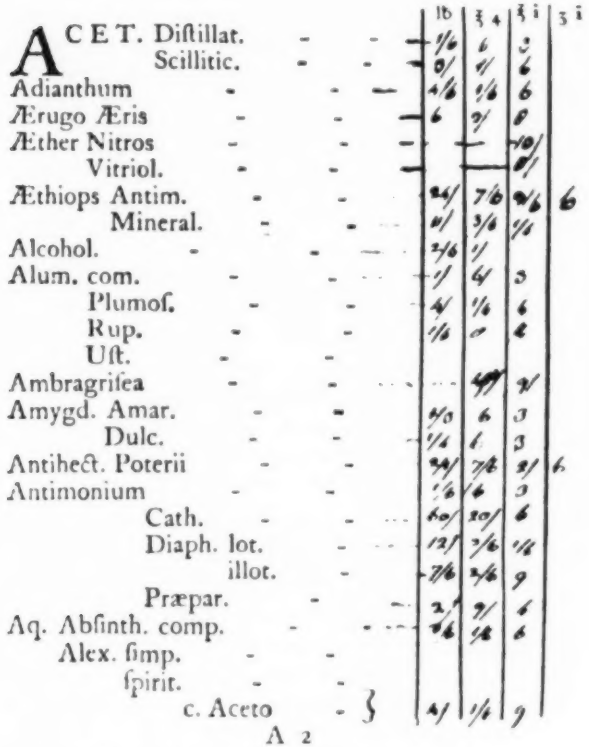
Check List of Pharmaceutical Catalogues

[1760] John Tweedy. A Catalogue of drugs, and of chymical and galenical medicines; sold by John Tweedy at his shop in Newport, Rhode-Island and for him in New York, at the sign of the Unicorn and Mortar, n.p., n.d., 28pp. DNLM, RHi

1771 John Day and Co. Catalogue of drugs, chymical and galenical preparations, shop furniture; patent medicines, and surgeons instruments, sold by John Day and Co., Druggists and Chymists, in Second Street, Philadelphia. Printed by John Dunlap, in Market Street, 1771. 29pp. PPAmP

Catalogus medicinarum et pharmacorum quae praeparantur et vanalia prostant. Philadelphia. Printed by John Dunlap, 1771. 20pp. DLC

CATALOGUS MEDICINARUM.



	lb	℥ 4	℥ i	ʒ i
ACET. Distillat.	1/6	6	3	
Scillitic.	0/	1/	6	
Adianthum	4/6	1/6	6	
Ærugo Æris	6	2/	0	
Æther Nitros			10/	
Vitriol.			0/	
Æthiops Antim.	24/	7/6	2/6	6
Mineral.	0/	3/6	1/6	
Alcohol.	2/6	1/		
Alum. com.	1/	4/	3	
Plumos.	4/	1/6	6	
Rup.	1/6	0	2	
Ust.				
Ambragrisea		4/	2/	
Amygd. Amar.	2/3	6	3	
Dulc.	1/4	1	3	
Antihect. Poterii	24/	7/2	2/	6
Antimonium	1/6	6	3	
Cath.	40/	20/	6	
Diaph. lot.	12/	3/6	1/4	
illot.	7/6	3/6	9	
Præpar.	2/	2/	6	
Aq. Abſinth. comp.	0/6	1/2	6	
Alex. ſimp.				
ſpirit.				
c. Aceto	4/	1/6	9	

Page of the Day-Dunlap 1771 Philadelphia Catalogue Showing Prices Added in Ink

1795 Smith and Bartlett. Catalogue of drugs and medicines, instruments and utensils, dye-stuffs, groceries, and painters' colours, imported, prepared, and sold by Smith and Bartlett, at their Druggists Store and Apothecaries Shop, No. 61, Cornhill, Boston, Printed by Manning & Loring, 1795. 22pp. MBP

1804 Joel and Jotham Post. A catalogue of drugs, medicines & chemicals, sold wholesale & retail by Joel & Jotham Post, druggists, corner of Wall and William-Streets, New York. Printed by William A. Davis, 1804. 40pp. DLC

[1812] George Brinley. A catalogue of drugs, medicines, dye-stuffs, painters' colours, surgeons' instruments, &c. &c. to be sold by George Brinley at his store No. 3, South Side of the Old Market House, Boston. MS notation "1812". 16pp. MWA

1814 T. W. Dyott. Approved patent and family medicines, drugs, paints, dyes, glass, medicine chests. Philadelphia, 1814. PC

1817 Charles White. A catalogue of the materia medica and of pharmaceutical preparations. Boston, G. E. Weld, 1817. 35pp. MBP, DNLM

1826 Philadelphia College of Pharmacy. The druggist's manual, being a price current of drugs, medicines, paints, dye-stuffs, glass, patent medicines, &c. Philadelphia, 1826
ICJ, ICU-M, NcU-Ph, PPiU, PPPCPh, ViRM

1828 Massachusetts College of Pharmacy. Catalogue of the materia medica, and of the pharmaceutical preparations, with uniform prices. Boston, 1828. 40pp. MBP

1831 George W. Carpenter. Essays on some of the most important articles of the materia medica . . . to which is added a catalogue of medicines, surgical instruments, &c. Philadelphia, 1831. 226pp.
DAPh, DNLM, NcU-Ph, PPiU, ViRM

1834	George W. Carpenter. Essays . . . to which is added a catalogue . . . Philadelphia, 1834. 320pp.	DAPh, DNLM, DSI, MdU-D
1842	A. S. Barry & Co., wholesale & retail dealers in drugs, medicines, . . . Alton, Ill., 1842. Single page broadside.	ICHi
1848	The glassblowers' list of prices of druggist's ware. MS "for the year 1848/49". Single page broadside.	DSI
1851	Eben Jackson, Jr. & Co., Dealers in drugs, medicines . . . Boston, 1851. 20pp.	PC
	Wheeler and Barclay. Wholesale dealers in drugs, paints, dye-stuffs, &c. Madison, Indiana, 1851. Single page broadside.	PC
1852	Bullock and Crenshaw. Catalogue of drugs, pharmaceutical preparations and medicinal wares. Philadelphia, April 1, 1852.	PC
1857	Bullock and Crenshaw. Catalogue of drugs. Philadelphia, February, 1857.	NcU-Ph
	Wilson, Fairbank & Co. Catalogue of drugs and medicines, English, French and American chemicals, and glassware. Boston, 1857. 128pp.	DLC
1858	Bullock and Crenshaw. Catalogue of drugs. Philadelphia, 1858. 96pp.	PC
1859	Barnard & Co. Price current. Saint Louis, 1859. 132pp.	DLC
1860	Bullock and Crenshaw. Catalogue of drugs, medicines, utensils, surgical instruments, &c. Philadelphia, 1860. 122pp.	DLC
	Smith & Dwyer. Drugs, medicines, chemicals . . . price current. Chicago, August 25, 1860. 4pp.	ICHi
1862	Bullock and Crenshaw. Catalogue . . . Philadelphia, 1862. 111pp.	DNLM

1865 Geo. C. Goodwin & Co. Catalogue of patent medicines, perfumery, toilet articles, &c. Boston, 1865. 24pp. MBP

S. Mandelbaum. Price list of druggists' & chemists' articles. New York, n.d. (circa 1865). 76pp. MBM

1869 Albert Dung & Son. Catalogue of drugs & chemicals. New York, 1869. 14pp. MBM

1870 Albert L. Hernstein. Illustrated catalogue. New York, 1870. NcU-Ph

J. F. Luhme & Co. General descriptive catalogue of chemical, pharmaceutical and physical apparatus. New York, n.d. (circa 1870). 160pp. NjWoE

Edward Parrish & Son. Annual priced catalogue of Parrish's Pharmacy. Philadelphia, 1870. 32pp. DLC, DSI

1871 Van Schaack, Stevenson & Reid. Prices current. Chicago, 1871. ICU-M

W. H. Schieffelin & Co. Prices current. New York, 1871. 130pp. DSI

1872 John F. Henry. A catalogue with prices, annual. New York, 1872-73. 240pp. WU-Ph, DLC

McKesson and Robbins. Prices current of drugs and druggists articles. New York, 1872. WU-Ph

A. S. Mellier. Illustrated catalogue and prices current of drugs. St. Louis, 1872. 126pp. MBM, MBP, WU-Ph

Van Schaack, Stevenson & Reid. Prices current. Chicago, 1872. ICU-M

W. A. Weed & Co. Illustrated yearbook of pharmacy information [and] prices current. Chicago, 1872. 192pp. ICU-M, MBM, MBP

1873 McKesson & Robbins. Prices current of drugs and druggists' articles. New York, 1873. 160pp. DSI

W. H. Schieffelin & Co. General prices current. New York, 1873. 140pp. MBM

Van Schaack, Stevenson & Reid. Prices current. Chicago, 1873. ICU-M

1874 McKesson & Robbins. Prices current of drugs and druggists' articles. New York, 1874. NCGC

Van Schaack, Stevenson & Reid. Prices current. Chicago, 1874. 378pp. DSI, ICU-M, WU-Ph

Henry K. Wampole & Co. Prices current. Philadelphia, March, 1874. 378pp. PC

Whitall, Tatum & Co. Glass ware. Philadelphia and New York, 1874. 46pp. PLACC

1875 Bullock and Crenshaw. Catalogue . . . Philadelphia, 1875. 140pp. DNLM

McKesson and Robbins. Prices-current of drugs and druggists' articles. New York, 1875. WU-Ph

Van Schaack, Stevenson & Reid. Prices current. Chicago, 1875. 404pp. DSI, ICU-M, WU-Ph

1876 Geo. C. Goodwin & Co. Catalogue . . . Boston, 1876-7. 128pp. MBP

McKesson and Robbins. Prices-current. New York, 1876. WU-Ph

W. H. Schieffelin & Co. General prices current. New York, July, 1876. 258pp. NCGC

George O. Stutts. Price list of druggists' glass ware. New York, 1876. 68pp. NjWoE

Van Schaack, Stevenson & Reid. Prices current. Chicago, 1876. 404pp. ICU-M

Whitall, Tatum & Co. Glass ware. Philadelphia and New York, 1876. 48pp. PLACC

1877 McKesson & Robbins. Prices-current of drugs and druggists' articles. New York, 1877. 174pp. MBP, NCGC, WU-Ph

Whitall, Tatum & Co. Glass ware. Philadelphia and New York, 1877. 96pp. PLACC

1878 Colburn, Birks & Co. Prices current. Peoria, Illinois, 1878. 516pp. DAPh

Lord, Stoutenburgh and Company. Prices-current of drugs, and druggists' sundries. Chicago, 1878. WU-Ph

McKesson & Robbins. Prices-current. New York, 1878. 208pp. MBP

Van Schaack, Stevenson & Reid. Prices current. Chicago, 1878. 404pp. ICU-M

Whitall, Tatum & Co. Glass ware. Philadelphia and New York, 1878. 96pp. PLACC

1879 Hagerty Bros. & Co. Catalogue of druggists' glassware, sundries, fancy goods, &c. New York, 1879. 272pp. DSI

Lord, Stoutenburgh and Company. Prices-current. Chicago, 1879. WU-Ph

McKesson and Robbins. Prices-current. New York, 1879. WU-Ph

Van Schaack, Stevenson & Co. Annual prices current. Chicago, 1879. 490pp. ICHi, WU-Ph

Weeks & Potter. Revised catalogue of foreign and domestic drugs. Boston, 1879. 215pp. MBP

Whitall, Tatum & Co. Druggists', chemists' and perfumers' glassware. Philadelphia and New York, 1879. 69pp. PLACC

1880 Bullock and Crenshaw. Catalogue of chemicals, chemical and pharmaceutical apparatus. Philadelphia, 1880. 152pp. DNLM, DSI

Geo. C. Goodwin & Co. Catalogue. Boston, 1880. 268pp. MBP

Hall & Ruckel. Prices current, 8th annual. New York, April, 1880. 356pp. MBP

Lord, Stoutenburgh and Company. Prices-current. Chicago, 1880. WU-Ph

McKesson & Robbins. Prices-current. New York, 1880. 226pp. MBP, NCGC, WU-Ph

Morrison, Plummer & Co. The druggists' ready reference. Chicago, 1880. 334pp. DLC, DSI, WU-Ph

Rust Bros. & Bird. Catalogue of drugs and druggists' articles. Boston, 1880. 164pp. MBP

Smith, Doolittle & Smith. Prices current. Boston, 1880. 288pp. MBP

Whitall, Tatum & Co., Druggists' . . . glass ware. Philadelphia, and New York, 1880. 72pp. PLACC, WU-Ph

1881 Lord, Stoutenburgh and Company. Prices-current. Chicago, 1881. 427pp. WU-Ph

Schieffelin & Co. General prices current. New York, 1881. 427pp. DAPh, DNLM, MBP, NCGC, WU-Ph

Van Schaack, Stevenson and Company. Price-current. Chicago, 1881. WU-Ph

Whitall, Tatum & Co., Druggists' . . . glass ware. Philadelphia and New York, 1881. 80pp. PLACC

1882 Lord, Stoutenburgh and Company. Prices-current. Chicago, 1882. WU-Ph

McKesson & Robbins. Prices-current. New York, 1882. 164pp. MBP

Morrison, Plummer and Company. Druggists' ready reference. Chicago, 1882. WU-Ph

Van Schaack, Stevenson and Company. Price-current. Chicago, 1882. WU-Ph

Whitall, Tatum & Co. Druggists' . . . glass ware. Philadelphia and New York, 1882. 88pp. PLACC

1883 McKesson & Robbins. Prices-current. New York, 1883. 480pp. MBP, NCGC, WU-Ph

McKesson & Robbins. Illustrated catalogue [to accompany prices current]. New York, 1883. Oversize 244pp. MBP, MnU-Ph, WU-Ph

W. H. Schieffelin and Company. General prices-current. New York, 1883. NCGC, WU-Ph

Whitall, Tatum & Co. Druggists' . . . glass ware. Philadelphia and New York, 1883. 88pp. PLACC, WU-Ph

1884 McKesson & Robbins. Prices-current. New York, 1884. 178pp. MBP

Van Schaack, Stevenson and Company. Price-current. Chicago, 1884. WU-Ph

Whitall, Tatum & Co. Druggists' . . . glass ware. Philadelphia and New York, 1884. 104pp. PLACC, WU-Ph

1885 Geo. C. Goodwin & Co. Catalogue. Boston, 1885. 384pp. MBP

McKesson and Robbins. Prices-current. New York, 1885. WU-Ph

Van Schaack, Stevenson and Company. Price-current. Chicago, 1885. WU-Ph

Whitall, Tatum & Co., Druggists' . . . glass ware; druggists' sundries. Philadelphia and New York, 1885. 106pp. PLACC

1886 McKesson & Robbins. Prices-current. New York, 1886. 206pp. MBP

Whitall, Tatum & Co. Druggists' . . . glass ware. Philadelphia and New York, 1886. 148pp. PLACC

1887 McKesson and Robbins. Prices-current. New York, 1887. MBP, WU-Ph

Morrison, Plummer & Co. The druggists' ready reference. Chicago, 1887. 736pp. MBP, WU-Ph

W. H. Schieffelin and Company. General prices-current. New York, 1887. WU-Ph

Robert Stevenson & Co. Wholesale druggists. Chicago, 1887. 522pp. WU-Ph

Van Schaack & Sons. Price current. Chicago, 1887. 739pp. ICHi, WU-Ph

Whitall, Tatum & Co. Annual price list. Philadelphia and New York, 1887. 162pp. PLACC, WU-Ph

1888 Lord, Owen and Company. Prices-current. Chicago, 1888. WU-Ph

McKesson & Robbins. Prices-current. New York, 1888. 218pp. MBP

Thurber, Whyland & Co. General prices current. New York, 1888. 208pp. DAPh

Weeks & Potter. Revised catalogue. Boston, 1888. 300pp. MBP

Whitall, Tatum & Co. Annual price list. Philadelphia and New York, 1888. 172pp. PLACC, WU-Ph

Meyer Brothers' Drug Co. Annual catalogue and prices current. St. Louis, 1889-90. 816pp. WU-Ph

Henry Troemner. Price list. Fine scale and weights. Philadelphia, April 1, 1889. 68pp. DSI

Van Schaack and Sons. Price-current. Chicago, 1889. WU-Ph

Whitall, Tatum & Co. Annual price list. Philadelphia and New York, 1889. 178pp. PLACC

1890 McKesson and Robbins. Prices-current. Chicago, 1890. WU-Ph

Noyes Bros. & Cutler. Catalogue. St. Paul, Minnesota, 1890. 476pp. WU-Ph

Robert Stevenson & Co. Wholesale druggists. Chicago, 1890. RU-Ph, WU-Ph

Van Schaack and Sons. Price current. Chicago, 1890. WU-Ph

Weeks and Potter. Catalogue of foreign and domestic drugs. Boston, 1890. 131pp. PC

Whitall, Tatum & Co. Annual price list. Philadelphia and New York, 1890. 198pp. Also supplemental price list. 32pp. PLACC

A SYLLABUS FOR PHARMACOGNOSY

By Gunnar Gjerstad *

WITHIN recent years the subject of Pharmacognosy has been singled out for considerable attack (1). It has been held that the number of crude drugs included in the official compendia has been greatly reduced during the last century, and it is very likely that the number will be further reduced in future editions. One author has even suggested dropping entirely pharmacognosy from the pharmaceutical curriculum, and one college has already reportedly omitted the general pharmacognosy course from its study plan.

That there is a need for a pharmacognosy course for pharmacy students should be evidenced by the fact that according to Ferguson (2) there are 571 drugs of biological origin still official, and there can be but little argument that materia medica will be dependent for some time to come upon drugs of biological origin which cannot easily be synthesized in an organic chemistry laboratory. There may, however, be some merit in the criticism which has been directed against the teaching of pharmacognosy and I would like to make a couple of points which I hope will be considered at the next Teachers' Seminar on Pharmacognosy.

According to the rather complete survey on pharmacognosy by Vanderwyk (3), it appears to me that the course set-up in sixty-seven pharmacy schools varies greatly. First of all, the number of credit hours of required pharmacognosy study ranges from three to fifteen. Secondly, there are still five schools where pharmacognosy is taught prior to organic chemistry, and twenty-two schools which teach it concurrently. In view of the recommendations of "The Pharmaceutical Survey" of 1948, this does not seem to be in line with its suggestion to introduce a chemical or biochemical arrangement of the subject matter. In addition to teaching the courses on a biochemical basis, thirteen other or mixed classifications are possible and evidently used.

It is also striking to note in Vanderwyk's survey that quite a few schools do not yet include the topic of antibiotics in their syllabi;

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whereas, some schools include allergenic products, herbicides, fungicides, insecticides, rodenticides, vaccines, serums, antitoxins, economic products other than drugs, prescription specialties and poisonous plants. It is highly questionable if all the above topics have a rightful place in pharmacognosy, especially if they comprise synthetic or inorganic compounds. Another debatable question is if these items can be covered adequately. This variety of subjects included in the course set-up is, in my opinion, a decided weakness, and may very well account for the criticism launched against pharmacognosy as such.

Turning to the laboratory work, it is very interesting to see that some schools do not have any laboratory study, thus weakening the justification for this item in the curriculum. The objectives and the requirements for the laboratory work vary within wide ranges. In the first place, some colleges require the macroidentification of numerous plant products of questionable quality (deteriorated samples and museum specimens). Some schools require the microidentification of powders and histological sections; whereas, in other colleges this work is not offered. From a recent inspection of our College, I have the impression that the AACP Committee on Accreditation of Pharmacy Schools is evidently against the identification requirement, and I feel that they are correct in this respect.

I have reviewed laboratory manuals used in various colleges and it is hard to believe that these laboratory manuals are used in identical courses. For instance, one college solely requires their students to identify a large number of drug powders and the only justification the teacher gave was that in this type of study the students could not easily give or receive aid from one another. Other laboratory guides which I have perused consist mainly of quotations of the official definitions, purity rubrics and standards of tests for the drugs in question, which encourages the students just to copy from the USP or NF, especially if the drug for testing is of inferior quality and fails to respond to official tests. The latter type of laboratory study is certainly not as thought provoking as is desired in a university.

One example of the other extreme is a laboratory manual which contains flow sheets for the preparation of, *i.e.*, adreno-cortical hormones from beef adrenals, liver extract, chymotrypsin, estrone from pregnant mare urine, purification of testicular hormones, production of chorionic gonadotropin from human pregnancy urine, prothrombin from normal human serum, albumin, insulin crystals and pantothenic

acid. In the same laboratory manual are chapters on crystallography, quantitative microscopy, histochemistry and plant morphology. However, it is not clear if all the specific experiments above are obligatory.

Another laboratory manual which I understand is in use in several colleges has in addition to chapters of plant morphology some features which in my opinion is a step in the right direction; namely, the extraction of various types of active ingredients from plant materials. This plan seems very reasonable since, after all, we do not use drugs because they represent a certain genus, species, family, or any particular plant part, or morphological structures, but because they contain active chemical ingredients which cure disease. Inasmuch as the pharmacists later in their careers will have slight, if any, opportunity for the practice of identifying plant drugs, the learning of the extraction of the plant principle seems the most logical, and impresses on the student the significance of crude drugs as a source for medicinally important alkaloids and glycosides, etc.

A laboratory guide of recent date includes in its seemingly heterogeneous makeup microscopic identification of starches, of pollen grains, of plant sections and a few plant powders; further, the separation of plant constituents by chromatography, preparation of emulsin, oxidases, and other plant enzymes. Also, the identification of plant constituents by several micro-chemical methods are included and, to top it all off, a study of antibody reactions of human blood, determination of Rh factor, and the production of antibiotics.

I have seen some examples where schools have changed their taxonomic syllabi to the chemical classification of drugs without changing the course content otherwise, and the laboratory manual is merely a realignment of subject material.

It seems to this observer that the primary goal for pharmacognosy teachers is to discuss and decide which items should be taught in a general, required course of pharmacognosy, and approximately in which sequence. This diversity of course content today, in my opinion, constitutes the greatest weakness towards the justification for teaching pharmacognosy.

A core syllabus ought to be agreed upon by a majority vote, and it would be in the interests of both the pharmaceutical and teaching professions if the instructors who, so far, have been "riding their educational hobby-horses" would yield to the majority opinion. I have discussed this problem of instituting a core curriculum in phar-

macognosy with experienced teachers in the field. Some of them have voiced objections for the reason that such an arrangement would be a violation of the professor's academic freedom. I certainly am not intending to infringe upon the academic freedom of the teacher because, even if a core syllabus were introduced, the *way* in which the subject material should be presented would in large measure be left up to the individual instructor. Furthermore, it has been stated that "Who cares about a core syllabus?" Even if certain reactionary teachers who "hate to give an inch" (4) would continue teaching the course as it was taught to them a generation ago, a remedy against this attitude would be for some organization, preferably the AACP, to prepare national examinations for the course just as there are national examinations in physics and chemistry, and the Graduate Record Examination. If this could be arranged, credit for a pharmacognosy course would be uniform throughout the country, and the State Board Examinations in materia medica might be made superfluous. As it is now, transfer students frequently will have to take the pharmacognosy course over in his new college because of a completely different syllabus. I know that some State Boards of Pharmacy have had the same idea for their registration examinations, *i.e.*, to have a uniform national examination. This arrangement would then do away with all the difficult reciprocation of pharmacists between the various states. After all, the practice of pharmacy in most of the states in this nation does not differ greatly one from another; neither ought the pharmaceutical curricula and syllabi.

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(1) Swain, R. L., *Drug Topics 91*, No. 9, 17 (1947).

(2) Ferguson, N. M., *A Textbook of Pharmacognosy*. The Macmillan Company, New York, 1956, p. 5.

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SELECTED ABSTRACTS

The Hydrophile-Lipophile Balance of Gums, Conclusion. Chun, A. H. C., Joslin, R. S., and Martin, A. N. *Drug and Cosm. Ind. 82*:312 (1958). In this second and concluding article on the subject of hydrophile-lipophile balance of gums, the authors reported that they found the average HLB value for acacia to be 8.0, for methylcellulose (Methocel 15 cps) to be 10.5, for gelatin (Pharmagel B) to be 9.8, and for tragacanth to be 13.2. These values were determined as an average of several emulsion series.

The authors also discussed the older concept that lipophilic (or w/o) and hydrophilic (or o/w) emulsifiers, when used together, are antagonistic toward each other. They indicated that this idea should be replaced with the concept of hydrophile-lipophile balance in which emulsifier combinations will often produce better emulsions than either emulsifier alone, provided they are not chemically incompatible. They pointed out that, for example, a w/o emulsion, such as the olive oil-lime water lotion type, is definitely improved by the addition of a small quantity of the o/w emulsifiers tragacanth or Tween 20. Further, a series of emulsions of mineral oil and water were prepared with mixtures of Tween 80 and Arlacel C over the HLB range of 3.7 to 15. At an HLB value of 4.8 and again at 10, the most stable emulsions were produced, the former being a w/o emulsion and the latter an o/w emulsion. It was observed that the change from w/o to o/w emulsions in the series was not abrupt but gradual over the HLB range of about 5.5 to 9.

As further indication that mixed emulsifying agents produce better emulsions than single emulsifiers, a series of o/w emulsions were made using mixed emulsifiers having a combined HLB of 10.5. Thus, acacia-Tween 20, tragacanth-acacia, tragacanth-Span 80, and Tween 20-Span 80 all made stable emulsions at an HLB of 10.5. However, none of them made stable o/w emulsions when used alone. Thus, the authors concluded that the best emulsion results when a mixture of natural or synthetic agents of opposite type are present at the interface so long as they are not physically or chemically incompatible. With a consideration of hydrophile-lipophile balance, chemical properties, and individual characteristics of emulsifying agents, it is possible to predict the best combination of emulsifiers for a stable emulsion.

Penetration of Aluminum From Antiperspirant Preparations. Blank, I. H., Jones, J. L., and Gould, E. *Amer. Perfumer 72:32* (1958). A series of experiments were reported in which aqueous solutions of aluminum salts were held in contact with a circumscribed area of excised skin for a definite period of time. After the exposure the cutaneous surface was washed, a disc was cut from the exposed area and the epidermis removed from the disc. The amount of aluminum present in the dermis was then determined quantitatively. It was found that little aluminum was present in the dermis. Had the aluminum salts penetrated directly through the sweat duct or through the epidermis and reached the sweat gland, they would have been detected in the dermal area by the assay techniques used.

The authors stated that it would appear that the aluminum combines with the proteins in the skin and is held in the outer part of the stratum corneum. Although the authors acknowledged that the data reported did not permit the drawing of definite conclusions, they felt that the amount of aluminum salts which reach the sweat glands under normal conditions of usage is too small to affect the physiological activity of these glands. If this is substantiated by additional studies, the antiperspirant action of aluminum salts will have to be explained on the basis of some other mechanism than that of an alteration of the physiological activity of the sweat gland.

C. F. GERSON, UNIVERSITY OF PITTSBURGH—1952

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